Trend Study 13B-1-00

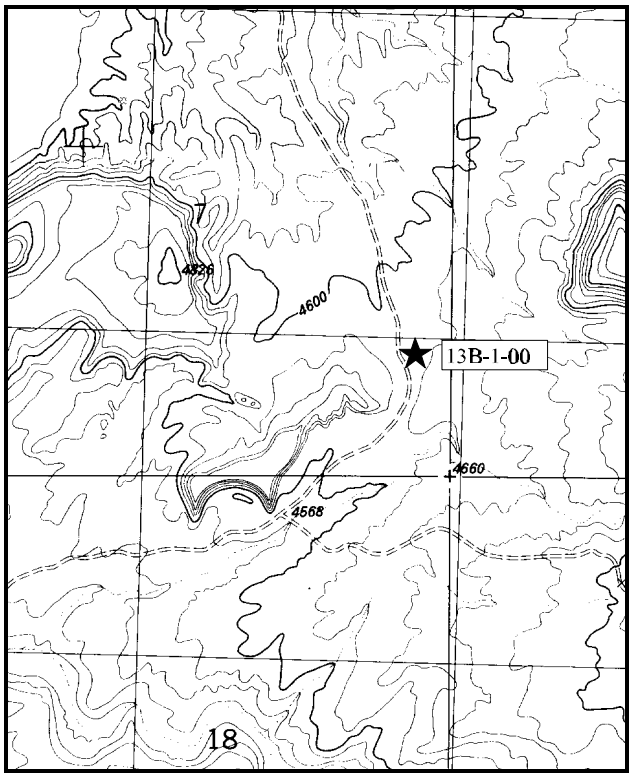
Study site name: Lower Westwater Dolores . Range type: Big Sagebrush-Grass .

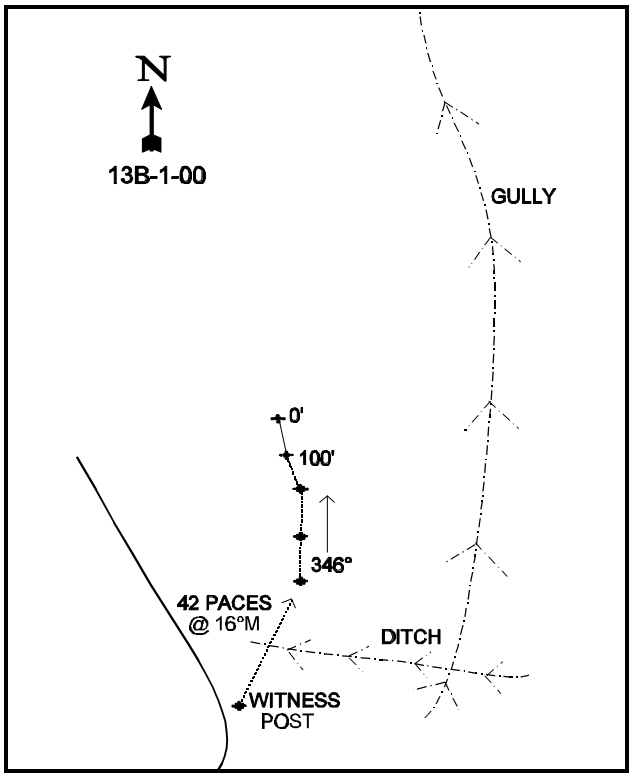
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the intersection of the DS Road and A Road west of Glade Park, Colorado, go down A Road 3.7 miles to the TZ Ranch gate. Turn left and go 1.25 miles along the fence to another gate (permission and key necessary to get through gates). Continue 5.6 miles to the state line. Go another 0.4 miles to a cabin. Turn right along the edge of a field and go 0.2 miles to a wire gate and another .05 to a pipe gate. Go 3.1 miles to transect 13B-2-00 (Upper Westwater Dolores). Continue 0.5 miles to a fork near a sheep corral. Keep right. Continue 1.25 miles to a wire gate, then another 0.85 miles to the witness stake, a 2 ½ foot tall fencepost off the right side of the road on top of the road cut. From the witness post, walk 42 paces at 16°M to the 400-foot baseline stake.





Map Name: Westwater 4SE Diagrammatic Sketch

Township 20S , Range 26E , Section 7 UTM. 4327183.657 N, 666823.360 E

DISCUSSION

Trend Study No. 13B-1 (34-1)

The Lower Westwater-Dolores transect is in a remote area that is basically accessible only through Colorado. The study is in a big sagebrush dominated open valley surrounded by slick rock cliffs and domes of sandstone. It is on a 10% west-facing slope, nearly 2 miles from the Colorado River at an elevation of 4,500 feet. The land is administered by the BLM out of the Grand Junction office in Colorado. The allotment is grazed by cattle and horses from November through May. This is a poor time to graze the area with respect to wildlife, when forage they are depending on is cheatgrass which makes up over 80% of the grass cover and has to have fall precipitation to germinate which it did not get in 1999. Deer pellet group quadrat frequency was moderate at 31% in 1995 and 39% in 2000. The pellet-group transect read in 2000 showed 79 deer days use/acre (195 ddu/ha), 12 elk days use/acre (30 edu/ha), and 27 cow days use/acre (67 cdu/ha).

The soil is protected fairly well by the combination of vegetation and litter. Litter was moderately abundant in 1995, mostly coming from annuals, with a cover value estimated at 51%. With drought, litter has now gone down to 35%. The vegetation and litter provide fairly good cover for the soil with no currently apparent erosion problems. However, pedestalling around the sagebrush is about 5 to 7 inches. Soil is deep with an average effective rooting depth of 19 inches. There is a compacted layer of fine sands and clay at about 6 inches, which becomes less compacted beyond 14 inches. Almost without exception, the shrub interspaces had more shallow effective rooting depths than near the base of the shrubs. The soil is classified as a sandy loam and moderately alkaline (8.2 pH). Soil temperature was moderately high at 64° F, which would favor the annuals during dry summers. Phosphorus could be limiting with a value of only 3.9ppm, where 10ppm is thought minimal for normal plant growth and development. The soil has a fine texture on the surface, but is composed mostly of sand. No rock or pavement was encountered on the surface or in the profile.

The key browse species on this site is basin big sagebrush with some apparent hybrids with Wyoming big sagebrush. This stand exhibits a distinctly clumped dispersion pattern with a dense understory of annual species. Some sagebrush display a clubbed appearance and have more character traits of Wyoming sagebrush, while others not clubbed and obviously not as preferred, have more traits of basin big sagebrush. The population structure has greatly changed since the last readings. In 1986, 88% of the population were young plants and no mature plants were reported. In 1995, only 1% of the population were young while 66% were mature. Currently ('00) it is just below 2%, still too low to maintain the population. Percent decadency has increased from 12% in 1986 to 32% in 1995, and 53% in 2000 with no seedlings reported for any year. It is very difficult to get seedlings established with the intense competition from the annual grasses and forbs. Basically there are no safe sites for them to become established, especially with the moderately high soil temperatures which will dry the soils out quickly in the summer. In 1995, 79% of the decadent population was classified as dying and the number of dead plants in the population (1,920 plants/acre) numbers more than the living. Currently, the number of decadent plants classified as dying has gone down slightly to 48%, however there are still more dead than live plants. Twenty-six percent of the population are classified as having poor vigor in 1995 and 2000. Cover from the Wyoming big sagebrush contributed only 8% of the total vegetative cover in 1995 and 12% in 2000. Mature plants in 1995 averaged 24 inches in height with a crown of 30 inches, now both of these measurements have decreased significantly to an average height and crown of 19 and 26 inches respectively. This is another indication of what extended drought does to sagebrush. Measurements of height and crown were not taken in 1986 because there were no mature plants reported at that time.

Other browse species include broom snakeweed and spiny hopsage which are in very low densities. Green ephedra was present in low numbers and heavily hedged in 1986 and appeared to be dying off. None were sampled in 1995. On the opposing slope, there is a vigorous stand of sand sagebrush, a few decadent spiny hopsage and a few scattered juniper.

In 1995, annual species (both grasses and forbs) contributed to 76% of the total vegetative cover on this site. Cheatgrass alone provided 61% of the total vegetative cover and 86% of the total grass cover. This changed little with the 2000 reading. There are very few perennial herbaceous species present which contribute to only a small percent of the herbaceous cover (17% for both 1995 and 2000). The most abundant perennial grass, galleta (a warm season grass) has significantly declined in nested frequency since 1988 and now only provides 12% of the total grass cover. Forbs accounted for 21% of the vegetative cover in 1995 with most being small annual species. Now the forbs account for only 11% of the vegetative cover, and again most are small annual species.

1986 APPARENT TREND ASSESSMENT

The soil trend is stable, although there is signs of some soil movement when the litter and/or cryptogam cover is disturbed. The vegetative condition and trend is somewhat puzzling. There appears to have been a sagebrush die-off in recent years. This was not because of grazing pressure because of only light to moderate use in the past. It was probably more of a response to the excessively wet years of 1983-85. Basin big sagebrush naturally experiences a fairly rapid turnover in generations, and it seems to be occurring on this site at the present time. There appears to be a sufficient proportion of young plants to maintain shrub density at an acceptable level. Trend therefore appears to be stable.

1995 TREND ASSESSMENT

Due to abundant protective ground cover, decrease in percent bare ground, and no apparent erosion problems, soil trend is considered stable. Although, most of the soil cover comes from annual species and litter. Although the abundant cover of annuals helps to protect the soil, it is very detrimental to the health of the community to have such a high amount of fine fuels present. It is just a matter of time before a fire will totally destroy the sagebrush population in the immediate area. Due to the poor age class structure, large numbers of dead plants and high decadence which has almost tripled to 36% since 1986, trend for the key browse species is down. To further aggravate this situation, 79% of the decadent plants are classified as dying. The lack of seedlings in the area is a function of extended drought conditions as well as intense competition with the winter annuals even when there could have been adequate precipitation for establishment. Herbaceous understory, while it does provide ground cover, has the potential to carry a very destructive fire. Therefore, the herbaceous understory trend is down.

TREND ASSESSMENT
soil - stable (3)
browse - down (1)
herbaceous understory - down (1) because it is mostly annuals

2000 TREND ASSESSMENT

With continued drought, there has been a significant drop in protective ground cover from 51% to 35%. This decrease has been mitigated somewhat by the increase of cryptogamic cover from 2 to 12%. However, the percent bare soil has increased from 18% to almost 39%. There still does not appear to be any apparent erosion problems, but soil trend would have to be slightly down with the current changes in protective cover and that most of the protective cover comes from annual species and litter. Although the abundant cover of annuals helps to protect the soil, it is very detrimental to the health of the community to have such a high amount of fine fuels present. It is just a matter of time before a fire will totally destroy the sagebrush population in the immediate area. Due to the poor age class structure, large numbers of dead plants and high decadence which has continued to increase (12% in 1986, 32% in 1995, and 53% in 2000), trend for the key browse species continues to be down. To further worsen this situation, percentage of decadent plants that are classified as

dying continues to be high at almost 50%. The lack of seedling establishment in the area was mentioned in 1995. This is a function of extended drought conditions as well as intense competition with the winter annuals even when normal precipitation occurs. The moderately high soil temperatures favors annuals, particularly winter annuals. Herbaceous understory, while it does provide ground cover, has the potential to carry a very destructive fire. Therefore, the herbaceous understory trend is down.

TREND ASSESSMENT
soil - slightly down (2)
browse - down (1)
herbaceous understory - down (1) because it is mostly annuals

HERBACEOUS TRENDS --
Herd unit 13B, Study no: 1

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
G	Bromus tectorum (a)	-	$_{b}$384	$_{a}$334	-	100	97	12.39	12.20
G	Hilaria jamesii	$_{c}$206	$_{b}$114	$_{a}$75	71	41	33	1.99	1.83
G	Oryzopsis hymenoides	-	-	1	-	-	1	-	.15
G	Sitanion hystrix	9	-	-	4	-	-	-	-
G	Sporobolus cryptandrus	$_{a}$1	$_{a}$-	$_{b}$23	1	-	10	-	.77
G	Vulpia octoflora (a)	-	46	48	-	18	25	.09	.27
Total for Annual Grasses		0	430	382	0	118	122	12.48	12.47
Total for Perennial Grasses		216	114	99	76	41	44	1.99	2.75
Total for Grasses		216	544	481	76	159	166	14.47	15.23
F	Astragalus spp.	$_{b}$12	$_{ab}$4	$_{a}$-	5	2	-	.01	-
F	Chenopodium fremontii (a)	-	$_{a}$-	$_{b}$39	-	-	19	-	.14
F	Chaenactis stevioides	-	3	-	-	1	-	.00	-
F	Cryptantha spp.	$_{a}$-	$_{b}$12	$_{a}$-	-	7	-	.03	-
F	Draba nemorosa (a)	-	$_{a}$3	$_{b}$14	-	1	7	.00	.03
F	Erodium cicutarium (a)	-	$_{a}$35	$_{b}$75	-	12	27	.45	1.25
F	Lappula occidentalis (a)	-	1	6	-	1	4	.00	.04
F	Lepidium densiflorum (a)	-	120	25	-	47	16	.79	.18
F	Leucelene ericoides	$_{ab}$26	$_{c}$56	$_{a}$15	11	28	7	1.12	.13
F	Machaeranthera canescens	-	-	1	-	-	1	-	.00
F	Navarretia intertexta (a)	-	$_{b}$61	$_{a}$18	-	25	9	.13	.07
F	Oenothera albicaulis (a)	-	$_{b}$9	$_{a}$-	-	4	-	.02	-
F	Plantago patagonica (a)	-	$_{b}$191	$_{a}$10	-	67	7	.61	.06
F	Sisymbrium altissimum (a)	-	$_{b}$156	$_{a}$24	-	68	15	.93	.24
F	Sphaeralcea parvifolia	-	7	5	-	5	2	.02	.01

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'95	'00	'86	'95	'00	'95	'00
Total for Annual Forbs		0	576	211	0	225	104	2.95	2.05
Total for Perennial Forbs		38	82	21	16	43	10	1.20	0.14
Total for Forbs		38	658	232	16	268	114	4.16	2.20

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 13B, Study no: 1

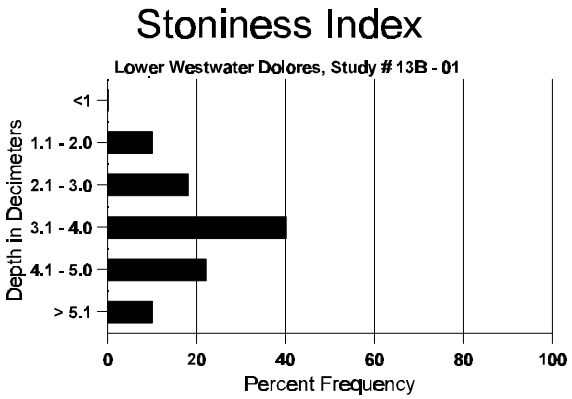
Type	Species	Strip Frequency		Average Cover %	
		'95	'00	'95	'00
B	Artemisia tridentata tridentata	41	29	1.69	2.39
B	Gutierrezia sarothrae	2	1	-	-
Total for Browse		43	30	1.69	2.39

BASIC COVER --
Herd unit 13B, Study no: 1

Cover Type	Nested Frequency		Average Cover %		
	'95	'00	'86	'95	'00
Vegetation	395	353	11.50	29.78	22.89
Rock	-	-	0	0	0
Pavement	-	-	.25	0	0
Litter	399	366	50.50	51.34	34.70
Cryptogams	150	264	18.50	2.17	12.19
Bare Ground	285	335	19.25	17.96	38.54

SOIL ANALYSIS DATA --
Herd Unit 13B, Study # 1, Study Name: Lower Westwater Dolores

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
18.98	63.8 (18.11)	8.2	71.0	16.4	12.6	0.0	3.9	118.4	0.1



PELLET GROUP FREQUENCY --
Herd unit 13B, Study no: 1

Type	Quadrat Frequency		Pellet Transect	
	'95	'00	Pellet Groups per Acre '00	Days Use per Acre (ha) '00
Rabbit	12	10	-	N/A
Elk	-	-	157	12 (30)
Deer	31	39	1027	79 (195)
Cattle	3	4	183	27 (68)

BROWSE CHARACTERISTICS --
Herd unit 13B, Study no: 1

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata tridentata																		
Y	86	25	40	1	-	-	-	2	-	-	65	3	-	-	4533			68
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	43	6	-	-	-	-	-	-	-	49	-	-	-	980	24	30	49
	00	7	11	9	-	1	-	-	-	-	28	-	-	-	560	19	26	28
D	86	-	1	3	-	5	-	-	-	-	8	1	-	-	600			9
	95	17	5	2	-	-	-	-	-	-	5	-	-	19	480			24
	00	3	15	6	2	5	-	2	-	-	17	-	-	16	660			33
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	1920			96
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1640			82

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	60%	05%	00%	
'95	15%	03%	26%	-21%
'00	52%	24%	26%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	5133	Dec:	12%
	'95	1480		32%
	'00	1240		53%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Grayia spinosa																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	17	26	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'95	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'95	0		-
	'00	0		-

Gutierrezia sarothrae																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20	12	12	1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'95	00%	00%	00%	-50%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'95	40		-
	'00	20		-

Opuntia spp.																		
M	86	1	-	-	-	-	-	-	-	-	-	1	-	-	66	6	7	1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	7	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'95	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	66	Dec:	-
	'95	0		-
	'00	0		-